Seminars in
Arthroplasty

Minimally Invasive Lateral Approach to Total Knee Arthroplasty

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The minimally invasive lateral approach may have advantages over a standard total knee arthroplasty incision. The following pilot study compares this lateral approach to a standard medial parapatellar approach to total knee replacement. Twenty-six knees utilizing this minimally invasive lateral approach for total knee arthroplasty were followed. These were compared with 53 knees with a standard medial parapatellar approach. Subjective and objective Knee Society scores, quadriceps function, visual analog pain scores, and various quality of life measures (SF-12 and other questionnaires) were analyzed. Mean follow up was 2 years. Patients in the lateral approach group had minimal anterior knee pain and reduced analgesic use, although a higher incidence of complications was encountered. A radiographic evaluation showed no difference in various radiographic indices between both groups. The preliminary results of this study are encouraging and warrant further investigation into techniques that would make the lateral approach safer for total knee replacement.

KEYWORDS minimally invasive surgery, primary total knee arthroplasty, lateral approach, skin incision, pain

Total knee replacements utilizing standard surgical approaches have led to excellent short-term and long-term results with survival rates over 95% at 10 years and greater in multiple studies.[1-8] On the other hand, these procedures are associated with significant morbidity in the short term. Patients are well aware that rehabilitative efforts can take 3 months or more and almost a year or longer until full recovery. Specifically, there is substantial pain and discomfort associated with total knee replacement, especially in the first 6 weeks postoperatively.

As a result of the short-term morbidity, the functional outcome of patients after total knee replacement has not always been optimal. In a number of studies analyzing patient-related outcomes, it appears that between 5 and 40% of patients are not completely satisfied with their total knee replacement.[8-10,] The total knee replacement limits patient participation in various activities, and multiple studies have described a discrepancy between how the surgeons perceive the results of total knee replacement and how patients believe they have done.[10]

There may be multiple reasons for these less than optimal results in some patients after total knee replacement. Traditionally, these procedures were performed with large incisions (15 to 30 cm) that were not muscle sparing. The quadriceps tendon was cut, leading to permanent dysfunction and weakness in the muscles. Additionally, the quadriceps mechanism is typically everted to expose the patella, and the knee joint is forcefully subluxed or dislocated, thereby causing trauma to the posterior capsular structures.

The lateral approach for performing total knee replacement was conceived as a less invasive method of performing a knee replacement with an attempt to minimize soft tissue trauma.[11] The purpose of this study is to summarize the clinical and radiographic outcome of the small, initial cohort of total knees performed using a short lateral incision.

Methods

This report studied the first 26 knees (26 patients) who received the lateral approach. All patients had a Scorpio™ knee

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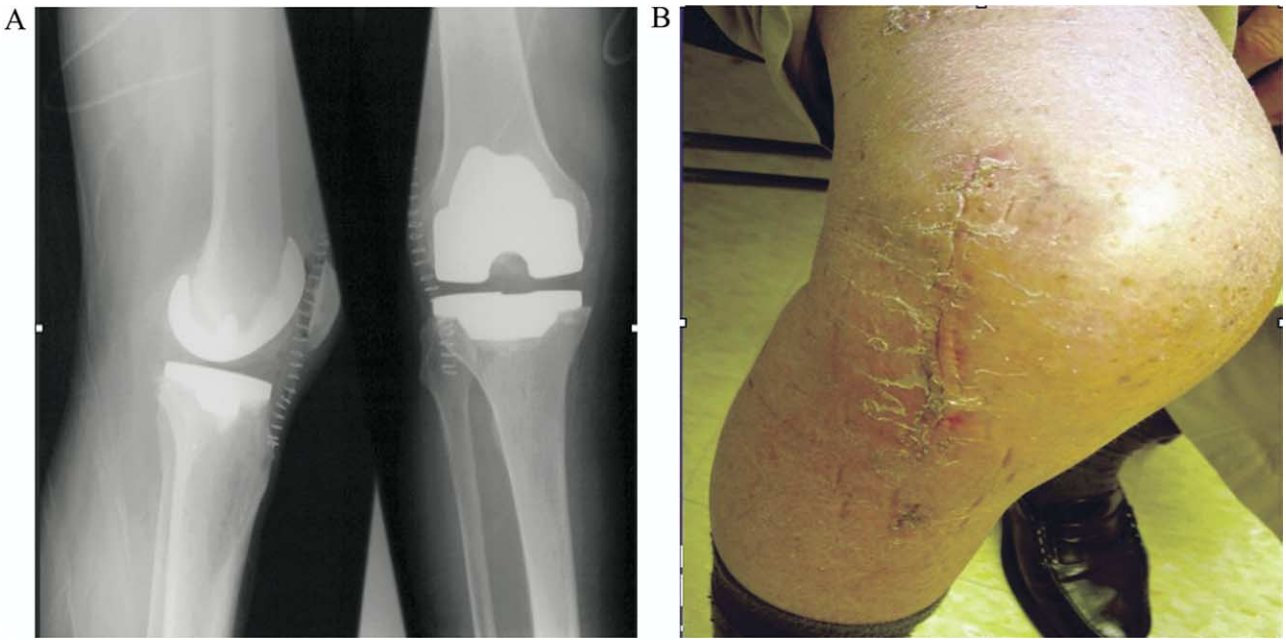

Figure 1 The incisions are usually less than 10 cm. Postoperative radiographs (A) and incision photographs (B) demonstrating the actual incision length. (Color version of figure is available online.)

(Stryker-Howmedica-Osteonics, Allendale, NJ). Patients were specifically analyzed for early functional and radiographic outcomes. There were 18 women and 8 men with a mean age of 63 years (range, 40 to 83 years). These patients were compared with a matching group of patients ($n = 53$) who had a standard total knee replacement utilizing a medial parapatellar approach.

Technical Features of the Lateral Approach

The features of the lateral approach that have been developed and used successfully include the following:

1. Small Incision Approach. The total knees have been implanted with incisions that are less than 10 cm (Fig. 1).
2. The procedure is muscle sparing. This approach goes through the iliotibial band only and avoids cutting into the quadriceps mechanism.
3. The patella is not everted in this procedure (Fig. 2).
4. The knee joint is not dislocated or subluxed during the procedure.
5. The incision is made from the lateral side. Although this is primarily a cosmetic advantage, it is certainly appreciated by patients (Fig. 3).
6. There is no need for lateral release in this approach.

To facilitate this procedure, there are a number of surgical techniques and equipment enhancements that include the following:

1. Customized instrumentation with a lower profile (Fig. 4).
2. The position of the leg allows for exposure of different parts of the knee. For example, flexion of the knee facilitates exposure of posterior structures and extension of the knee allows visualization of anterior structures. The use of a mobile window allows access to all parts of the knee joint by moving the knee joint as needed.
3. Bone platforms can be used to take out bone in a piecemeal manner when necessary. What this means is that the instruments can be used to make partial cuts, with the remaining cut referenced off the instrumented part of the bone cut.

Because the subcutaneous nerve plexus on the lateral side

Figure 2 The patellar preparation involves cutting the patella in situ on top of the femoral trial component or minimal subluxation of the patella to make the cuts and preparation. (Color version of figure is available online.)